Algebra (ratios – word problems)

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**Ratios**

**Complete.**

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| |  |  | | --- | --- | | 1. | Smallville had a great football team last year. They outperformed their opponents in almost every category of play. One of their more impressive statistics was that, on average, they outscored their opponents by 3:1 in every game they played. If they scored an average of 21 points per game, what was the average number of points scored by their opponents per game? | | |  |  | | --- | --- | | 2. | The local election is over and a new mayor has been elected to lead Big Town. The new mayor received three votes for every vote received by her opponent. The new mayor received 2,448 votes. How many votes did her opponent receive? | |

**Complete.**

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| |  |  | | --- | --- | | 3. | Hunter analyzed some pollen grains found near a site that is thought to have been inhabited by humans many thousands of years ago. He found 80 examples of grass pollen, 18 examples of oak pollen, and 30 examples of unknown kinds of pollen. Let's assume his analysis was typical of the site and that another scientist could study the site and determine the exact same proportions of the three classes of pollen. Assuming this, if there were 16,000 pollen grains in the area of study, how many of them would be of an unknown type? | | |  |  | | --- | --- | | 4. | In a population of 768,677 cells some are undergoing division and some are not. Assume that while some of the cells are dividing, no other cells will begin to divide to until the group that is dividing is finished. Let's say the ratio of dividing to not dividing cells is 8 to 5. What will the cell population be after the cells that are dividing have completed the division process? | |

**Complete.**

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| |  |  | | --- | --- | | 5. | A soil sample from near a factory is analyzed to see if it is polluted. In one test, 11 g of soil was dried to remove water. After drying, 76% of the original mass remained. An elemental analysis was performed and the soil was found to be 26% carbon, 20% oxygen, 10% hydrogen, and the rest was ash. Ash contains minerals and other difficult to decompose matter. Assuming all the ash was the result of soil minerals, how many grams of minerals was in the original soil sample? Round your answer to the nearest hundredth. | | |  |  | | --- | --- | | 6. | A core sample from the town square was drilled and collected by Z-Globe. Analysis revealed alternating layers of clay and volcanic shale. Each layer of shale was only about 1/4 as thick as a layer of clay. If the total sample was 74 feet in thickness, what was the approximate clay to shale thickness ratio? | |

**Complete.**

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| |  |  | | --- | --- | | 7. | Space ship Z is traveling at 182,000 miles per second. Spaceship Q is traveling at 173,000 miles per second. What is the ratio of speeds (Z/Q) of the two spaceships? Express your answer in terms of the maximum speed of light, which is 186,000 miles per second. | | |  |  | | --- | --- | | 8. | Megan dropped rock 1 (mass = 3.6 kg) from a height of 11 meters. She then dropped rock 2 (mass = 3.5 kg) from the same height. What was the ratio of kinetic energies of the rocks (KErock1/KErock2) when they hit the ground? (note: the acceleration of gravity is 9.81 m/s2.) | |

**Complete.**

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| |  |  | | --- | --- | | 9. | The ratio of iron atoms to chromium atoms in a water sample from the treatment pond at Z-Globe is 11 to 3. If there are 163 chromium atoms in a liter of the water, how many iron atoms are there in a liter? Round your answer to the nearest whole number if needed. | | |  |  | | --- | --- | | 10. | Mackenzie worked overtime at the lab to perform a chemical analysis on some sludge of unknown composition. She found it to be 23.2% water by mass. If she completely dried a 144-g (original mass) of the sludge, how much water was removed in the drying process? Round your answer to the nearest hundredth. | |

**Complete.**

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| |  |  | | --- | --- | | 11. | The Bigtown football team outscored its opponents 5:1 last season. If their opponents scored 43 points, how many points did Bigtown score? | | |  |  | | --- | --- | | 12. | The Littleville basketball team tries 2 field goals for every free throw. They make a third of their attempts of either try. If they make 18 free throws in a game, how many field goals are they expected to make? | |

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| **Answer Key 0137007** |

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| **Complete.** |

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| |  |  | | --- | --- | | 1. | Smallville had a great football team last year. They outperformed their opponents in almost every category of play. One of their more impressive statistics was that, on average, they outscored their opponents by 3:1 in every game they played. If they scored an average of 21 points per game, what was the average number of points scored by their opponents per game?   **7** | | |  |  | | --- | --- | | 2. | The local election is over and a new mayor has been elected to lead Big Town. The new mayor received three votes for every vote received by her opponent. The new mayor received 2,448 votes. How many votes did her opponent receive?   **816** | |

**Complete.**

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| |  |  | | --- | --- | | 3. | Hunter analyzed some pollen grains found near a site that is thought to have been inhabited by humans many thousands of years ago. He found 80 examples of grass pollen, 18 examples of oak pollen, and 30 examples of unknown kinds of pollen. Let's assume his analysis was typical of the site and that another scientist could study the site and determine the exact same proportions of the three classes of pollen. Assuming this, if there were 16,000 pollen grains in the area of study, how many of them would be of an unknown type?   **3750 unknown type** | | |  |  | | --- | --- | | 4. | In a population of 768,677 cells some are undergoing division and some are not. Assume that while some of the cells are dividing, no other cells will begin to divide to until the group that is dividing is finished. Let's say the ratio of dividing to not dividing cells is 8 to 5. What will the cell population be after the cells that are dividing have completed the division process?   **1241709 cells** | |

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| **Answer Key 0137007** |

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| **Complete.** |

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| --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | 5. | A soil sample from near a factory is analyzed to see if it is polluted. In one test, 11 g of soil was dried to remove water. After drying, 76% of the original mass remained. An elemental analysis was performed and the soil was found to be 26% carbon, 20% oxygen, 10% hydrogen, and the rest was ash. Ash contains minerals and other difficult to decompose matter. Assuming all the ash was the result of soil minerals, how many grams of minerals was in the original soil sample? Round your answer to the nearest hundredth.   **3.68 g** | | |  |  | | --- | --- | | 6. | A core sample from the town square was drilled and collected by Z-Globe. Analysis revealed alternating layers of clay and volcanic shale. Each layer of shale was only about 1/4 as thick as a layer of clay. If the total sample was 74 feet in thickness, what was the approximate clay to shale thickness ratio?   **4 to 1** | |

**Complete.**

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| |  |  |  | | --- | --- | --- | | 7. | Space ship Z is traveling at 182,000 miles per second. Spaceship Q is traveling at 173,000 miles per second. What is the ratio of speeds (Z/Q) of the two spaceships? Express your answer in terms of the maximum speed of light, which is 186,000 miles per second.   |  | | --- | | **163 http://www.edhelperclipart.com/clipart/fractdiv3.gif 155** | | | |  |  |  | | --- | --- | --- | | 8. | Megan dropped rock 1 (mass = 3.6 kg) from a height of 11 meters. She then dropped rock 2 (mass = 3.5 kg) from the same height. What was the ratio of kinetic energies of the rocks (KErock1/KErock2) when they hit the ground? (note: the acceleration of gravity is 9.81 m/s2.)   |  | | --- | | **36 http://www.edhelperclipart.com/clipart/fractdiv2.gif 35** | | |

**Complete.**

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| --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | 9. | The ratio of iron atoms to chromium atoms in a water sample from the treatment pond at Z-Globe is 11 to 3. If there are 163 chromium atoms in a liter of the water, how many iron atoms are there in a liter? Round your answer to the nearest whole number if needed.   **598 iron atoms** | | |  |  | | --- | --- | | 10. | Mackenzie worked overtime at the lab to perform a chemical analysis on some sludge of unknown composition. She found it to be 23.2% water by mass. If she completely dried a 144-g (original mass) of the sludge, how much water was removed in the drying process? Round your answer to the nearest hundredth.   **33.41 g** | |

**Complete.**

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| |  |  | | --- | --- | | 11. | The Bigtown football team outscored its opponents 5:1 last season. If their opponents scored 43 points, how many points did Bigtown score?   **215 points** | | |  |  | | --- | --- | | 12. | The Littleville basketball team tries 2 field goals for every free throw. They make a third of their attempts of either try. If they make 18 free throws in a game, how many field goals are they expected to make?   **12 field goals** | |